

REMARKS

Claim 16 has been amended in order to clarify that Applicant's claimed method comprises lubricating a heavy duty diesel engine that is equipped with a catalyzed particulate trap, with a lubricating oil that consists essentially of an anti-wear, anti-oxidant and corrosion-inhibiting lubricating oil that has a low sulfur content and comprises ZDDP and contains ZDDP at a concentration of up to 0.8 weight percent and optionally also comprises at least one additional additive selected from the group consisting of an anti-wear additive, an anti-oxidant additive, a corrosion inhibitor, an anti-foam additive, a Viscosity Index improver and a dispersant.

The connector "consisting essentially of" has been employed in order to indicate that no lubricating oil is employed other than the anti-wear, anti-oxidant and corrosion-inhibiting lubricating oil that has a low sulfur content and comprises ZDDP.

Support for these amendments is found in Applicant's specification on page 3, lines 25-26 and page 4, lines 1-3, 7-8, 14-15, 18-19 and 21-23.

Claims 33-35 have been amended to change "lube" to lubricating." Claims 34-39 and 53 have been amended to add "low sulfur" before "lubricating oil." Antecedent basis for this in Claim 1 is provided by "lubricating oil having a low sulfur content..." An additional clarification has also been made to Claim 53, and Claim 41 has been amended to change the size range of nucleation made particles to "0.3nm to 0.7nm." Support for this amendment is found in Examples 1 and 2 in Applicant's specification.

Claims 16, 25, 26, 33-39, 41 and 53 remain pending.

Thus, Applicant's claims are directed to a method for lubricating a heavy duty diesel engine that is equipped with a catalyzed particulate trap. Applicant's claims

require the use of a single lubricating oil that consists essentially of, or is, a low-sulfur lubricating oil that must contain ZDDP and the ZDDP must be present therein at a level of up to 0.8 weight percent. Furthermore, the lubricating oil must have anti-wear, anti-oxidant, and corrosion-inhibiting properties.

By contract, Chamberlin et al. discloses a low-sulfur, ZDDP-free, "consumable" lubricating oil which cannot be used as the sole oil for lubricating a heavy duty diesel engine. The low-sulfur, ZDDP-free, consumable oil disclosed in Chamberlin et al. is characterized by the absence of an extreme pressure additive containing metal and phosphorus (column 2, lines 40-42; column 4, lines 16-18; and 28-30 and column 12, lines 43-45). Thus, ZDDP cannot be present in the low-sulfur lubricating oil of Chamberlin et al. Therefore, as the disclosure of Chamberlin et al. makes perfectly clear, the low-sulfur, ZDDP-free, consumable lubricating oil of Chamberlin et al. cannot be used as the sole oil for lubricating a heavy duty diesel engine. The Declaration under 37 C.F.R. 1.132 of Dr. Gordon Lamb will address these issues further.

Chamberlin et al. discloses in column 14, lines 21-33 and 38-41 that the low-sulfur, ZDDP-free, consumable oil disclosed therein can be used only in the low wear areas of an engine while a "conventional lubricating oil composition" must be used in the high wear areas of his invention. Example 1 of Chamberlin et al. employs an engine which has a cam shaft and the valve train (which includes the cam shaft) is separated from the crankcase. The high wear valve train is lubricated using a conventional lubricating oil composition, while only the low wear crankcase is lubricated using the low-sulfur, ZDDP-free, consumable lubricating oil disclosed therein. This is described in Chamberlin et al. in column 17, lines 15-18 and 22-25.

Furthermore, the engine employed in Example 1 uses gasoline as the fuel and is a gasoline engine, not a heavy duty diesel engine as in Applicant's claims.

Figure 1 in Chamberlin et al. illustrates a camless engine which contains only low wear areas. The high wear areas--namely, the intake and exhaust valves--are not controlled or lifted by a camshaft and are not shown in Figure 1. Thus, the low-sulfur lubricating oil of Chamberlin et al. is not employed for the high wear cam shaft but is only employed for the crankcase, which Chamberlin et al. describes in column 14, 30-33 as only a low wear area of the engine. By contrast, the high wear areas are described in column 14, lines 25-29 and 52-56. Such camless engines are not conventionally employed as heavy duty diesel engines.

Clearly Chamberlin et al. neither discloses nor suggests that the low-sulfur, ZDDP-free, consumable lubricating oil disclosed therein has the anti-wear, anti-oxidant and corrosion-inhibiting properties that are necessary for a lubricating oil to be used for the high wear areas of an engine, or, in other words, as the sole oil for a heavy duty diesel engine.

The Examiner has cited various combinations of Chamberlin et al. with the following four secondary references: Alcorn et al., Papay et al., Cooper et al. and Twigg et al. Each of Alcorn et al., Cooper et al. and Twigg et al. discloses the use of some type of a particulate trap in combination with a conventional engine and a single conventional lubricating oil. None of these three references discloses a camless engine or an engine in which the cam shaft is separated from the crank case. Furthermore, none of these references discloses the use of a conventional ZDDP-containing lubricating oil for the high wear areas of the engine and a second low sulfur, ZDDP-free, consumable lubricating oil for the low wear areas of the engine.

Applicant is not claiming to have invented the use of catalyzed particulate traps in combination with engines. The use of a catalyzed particulate trap is only one element among many elements in Applicant's claims. Furthermore, Chamberlin et al. itself discloses the use of particulate traps and catalyzed traps in column 1, line 22 and column 3, lines 29-30. Consequently, it is respectfully submitted that none of the disclosures of Alcorn et al, Cooper et al. and Twigg et al. add anything to the disclosure of Chamberlin et al. Furthermore, the disclosures of these three references do not serve to bridge the gap between (a) the use in Chamberlin et al. of a low sulfur, ZDDP-free, consumable lubricating oil for only the low wear areas of an engine in which the high wear and low wear areas of the engine are separated, and (b) Applicant's use of a low sulfur, ZDDP-containing lubricating oil as the sole lubricating oil for both the high wear and low wear areas of a heavy duty diesel engine. Furthermore, Twigg et al. discloses a CRT which is intended for use only with light duty diesel engines. Therefore, even if Chamberlin et al. could be properly combined with Alcorn et al., Cooper et al. and Twigg et al., the resulting combination of disclosures would still be inadequate to render Applicant's claimed invention obvious.

However, neither Cooper et al nor Twigg et al. can be properly combined with Chamberlin et al. The method of Chamberlin et al. is intended to reduce NOx levels in exhaust gases. This is disclosed in column 1, lines 16-17 and 65-67, and in Example 1 and Figure 2. However, Cooper et al. discloses that NOx is required in the exhaust gas in order for catalyzed particulate trap disclosed therein to combust particulates in the exhaust gas. This is disclosed in Cooper et al. in column 1, lines 44-53 and column 2, lines 2-15. As Twigg et al. discloses in column 1, lines 27-60, the method disclosed therein is merely a variation of the method of Cooper et al. and

similarly requires NOx in the exhaust gas. Thus, Chamberlin et al. attempts to eliminate NOx from the exhaust gas, while Cooper et al. and Twigg et al. require the presence of NOx in the exhaust gas. Obviously one of ordinary skill in the art would not combine the disclosure of Chamberlin et al. with the disclosures of either Cooper et al. or Twigg et al.

Finally, Papay et al. discloses numerous lubricating oil compositions, but each such composition must include "one or more oil-soluble boron-free additive compositions formed by heating (i)...with (ii) at least one inorganic phosphorus acid such that a liquid boron-free phosphorus-containing composition is formed." This statement appears at several points in Papay et al., including in column 5, lines 5-10 and column 6, lines 1-6. However, the low sulfur, ZDDP-free, consumable lubricating oil of Chamberlin et al. is characterized by the absence of phosphorus. Thus, one of ordinary skill in the art would not combine the disclosures of Chamberlin et al. and Papay et al.

In view of the above amendments and remarks Applicant respectfully submits that her Claims 16, 25, 26, 33-39, 41 and 53 are in condition for allowance, and respectfully requests reconsideration and allowance of her claims.

Respectfully submitted,

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